Trends in Rural School Segregation: An Examination of Eastern North Carolina School Districts

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Introduction

In 2007, a report released on Wayne County, North Carolina, argued that the local school board's desire to maintain "neighborhood schools" led to racially and economically segregated schools in their district (Joyner & Marsh 2007). Of particular concern was Goldsboro High School, a virtually all-minority, high poverty school that consistently underperformed the prior decade; no major efforts to remedy the situation. Prompted by the evidence of the study, the North Carolina NAACP and the national NAACP Legal Defense Fund filed a Title VI complaint with the U.S. Department of Education and the Educational Opportunities Section of the Justice Department's Civil Rights Division. The attention has led to an agreement by the U.S. Department of Education to investigate Wayne County and announcing a new pledge to enforce civil rights laws. Despite the buzz generated by the report, the investigation is still underway; no verdict has been reached as to whether the Wayne County School Board is at fault or not.

Whether or not the situation in Wayne County was due to deliberate actions, it raises the question of just how equitable public education at both the state and national level really is. Are other districts facing similar problems, or is Wayne County an anomaly? State-sponsored segregation was supposed to have ended nearly 60 years ago with the landmark *Brown v. Board of Education* Supreme Court case, but a most recent study by Clotfelter, Vigdor, and Ladd (2013) argues that schools in North Carolina have been "resegregating" since the 1990s—both racially and economically. Aside from the ethical responsibility of school boards to maintain diverse schools, the question of racial and economic disparities is a policy issue due to their correlation to student achievement and teacher credentials. This paper will explore trends and relationships of racial and economic demographic dissimilarities between eight North Carolina

school districts with the intention of better understanding the story of segregation in rural schools.

Historical Background on Resegregation

The story of segregation in America follows a series of court cases that first enforced strict mandates on school diversity in the mid-1950s and eventually waned in the last decade of the millennium. In 1954, the landmark Supreme Court decision *Brown v. Board of Education* brought an end to the dark era of government-sponsored segregation, declaring laws creating separate black and white public schools unconstitutional (Brown 1954). The symbolic court decision did not lead to immediate change however. Many Southern districts failed to make strong plans for integration. More specifically, many districts switched to a "freedom of choice plan," allowing students to choose which school they wanted to attend. In practice, the policy did little to correct the situation; only a few African American students chose to attend formerly white schools while no white students choosing to attend the black school (Jody & Brian 2006).

The prolonged failure of districts to integrate led the Supreme Court to make further enforcements in the following decade. In the 1964 case of *Griffin v. County School Board*, the Supreme Court propelled the effort, demanding the "effective and quick" end to segregation (Griffin 1964). In the same year of the *Griffin* case, the 1964 Civil Rights Act was passed. Title VI of the act established federal funding for desegregation efforts, giving a new backbone to the integration effort and further pushing forward the effort (Chemerinsky 2003). The federal government began barring funding from districts that pursued segregation policies, adding a new tool in achieving balances schools (Cascia et al 2010). Ten years since the *Brown* case, only 1.2 percent of African-American students were attending schools with whites (Klarman 1994).

Two subsequent Supreme Court decisions in the years following propelled the effort further. First, the Supreme Court finally put an end to the freedom of choice school policies that stymied integration with the 1968 *Green v. County School Board of New Kent Court (Virginia)* verdict (Clotfelter et al 2013, Greene 1968). Districts were mandated to form more effective plans to achieve racial balance in the school. A few years later this decision was followed by the 1971 *Swann v. Charlotte-Mecklenburg County* case, which held that busing students to promote integration was constitutional (Swann 1971). By restricting weaker school assignment policies and permitting new tools for combatting segregation, the result was outstanding. The South soon had some of the most integrated districts in the country, and segregation seemed like a relic of the past (Clotfelter et al 2013). The combination of these two cases had a tremendous effect. By 1968, the rate of integration as at a high of 32 percent, and by 1973 over 90 percent of school districts in the South were desegregated (Klarman 1994).

However, with integration now effectively achieved, public attention began shying away from the issue. Following the Supreme Court ruling in *The Board of Education of Oklahoma City v. Dowell* in 1991, southern school districts were allowed to declare themselves "unitary" if they had proven to be fully integrated, releasing them from the federally enforced desegregation mandates (Board of Education 1991). This returned power to the local school boards in handling the issue, and having achieved integration, many districts declared themselves unitary. Some school boards wanted to keep strict measures in place even once released of federal oversight. (Bryant 1997). However, the extent to which local courts could mandate such plans would soon be constrained. In 1992, the *Freeman v. Pitts* decision decreed that "where re-segregation is a product not of state action but of private choices, it does not have constitutional implications. . . . It is beyond the authority and beyond the practical ability of the federal courts to try to

counteract these kinds of continuous and massive demographic shifts" (Freeman 1992). A third decision in 1995, *Missouri v. Jenkins,* barred the use of state government funds to invest in educational improvement programs such as magnet schools for the purpose of remedying segregation (Missouri 1995).

A further substantial change occurred just six years ago in the 2007 Supreme Court case *Parents Involved in Community Schools v. Seattle School District No. 1.* The case addressed two different voluntary desegregation efforts in Seattle, WA, and Louisville, KY. The districts of both cities voluntarily employed individualized school assignment policies based on racial classifications in an effort to prevent a reversal to racial isolation in schools. In a 4-1-4 Supreme Court ruling, the court invalidated race as a specific consideration in assignment policies since the segregation they were trying to combat was not state-sponsored—as was the case prior to *Brown v. Board.* They contended that school boards are to have a commitment to promote racial diversity, but with this ruling school boards are limited in their ability to achieve this end (Parents Involved 2007).

Literature and Past Research

The question of segregation has profound implication on education equity. It is important to distinguish that segregation comes in two different forms: economic and racial segregation. The majority of research has shown economic segregation to have the most direct effect on student achievement. Research by Rumberger and Palardy (2005) has shown that concentrations of high-poverty students have negative consequences for achievement growth. In fact, these detrimental effects impact advantaged and disadvantaged students equally and also affect both White and Black students almost equally (Rumberger & Palardy 2005). A separate study by the

Department of Education in 1993 revealed that school-wide poverty negatively affects student achievement, independent of his or her socioeconomic status (Puma et al 1993).

Additionally, teacher retention rates are much lower in schools with a high-concentration of poverty students. Constantly having to higher new teachers as old one leave takes time away from other priorities for school administrators and funding at the schools that could have been delegated towards improving academic quality. The same study showed that high-poverty, segregated schools are more likely to have inexperience, less-qualified teachers (Henry et al. 2008). Some research has suggested that school districts save money in the long-term if they undergo expensive redistricting efforts to split up such high-poverty schools (Joyner & Marsh 2007).

However, the connection of economic segregation to racial segregations is the relationship between minorities and high-poverty schools. Roughly 40 percent of all Black and Latino students attend high-poverty elementary schools, a stark contrast from the 5 percent of White students who attend such schools (Aud et al. 2010). Though the two issues are not one in the same, the association between minorities and low-income schools calls for their coupling when addressing the question of public school segregation. The majority of research has pointed to the waning of court jurisdiction described in the earlier section as the major underlying cause of racial resegregation in public schools (McNeal 2009; Bryan 1997; Doyle 2005; Frey & Wilson 2009). The various Supreme Court verdicts described earlier put limits on certain tools for desegregation as well as influenced lower court behavior.

Following the wave of court orders relinquishing mandated desegregation, the majority of school districts in the South switched to a neighborhood system of public schooling; this is

especially characteristic of more rural districts that are smaller in population density (Reardon et al 2006). In neighborhood-based school, attendance zones are drawn to divide up the county into regions that determine what school a student attends. The original decision to switch to a neighborhood system was a major reason the South achieved quicker integration in the 1970s; Southern cities have historically been more residentially integrated than those in other regions of the country (Cutler, Galeser, & Vigdor 2001).

However, recent research shows that patterns of residential segregation have increased in more recent decades; although African-Americans represent just over one-tenth of the U.S. population, the average urban African-American lives in a neighborhood that is over fifty percent black (Vigdor 2003). A recent study in 2007 showed that recent patterns of rural segregation mirror these urban trends (Lichter et al 2007). For rural counties that lack the school choice options of metropolitan areas, this suggests a possible trend of increasing segregation in school as well.

Unlike school systems that allow intra-district choice, in neighborhood schools "families must undertake expensive moves in order to change public schools" (Cullen & Rivkin 2003 p. 88). In intra-district choice systems, families are given an option of multiple schools and public transportation is provided for each. Students are not bound to attend their designated school in a neighborhood system, but switching schools comes with costly obstacles easier for families of a higher socioeconomic status. If transfer laws in the county are strict, a family must move residence to respective school zone of the desired school. If transfer laws are lax, then the family could remain in their current home, but their children are excluded from public bussing to schools out of their attendance zone. In either situation, neighborhood schools permit school

choice flexibility for richer families and disproportionately affect lower socioeconomic classes (Joyner & Marsh 2011).

Research also suggests that the increasing immigration of Hispanics to rural districts may have an impact on school segregation levels. One study showed that although Hispanics made up only 5.5 percent of the nonmetropolitan U.S. population in 2000, they accounted for over 25 percent of growth during the prior decade (Kandel & Cromartie 2004). A recent study in 2010 concludes that Hispanics are highly segregated residentially in "new Hispanic destinations," tending to find housing in predominantly Hispanic neighborhoods (Lichter et al 2010).

An often debated possible cause of increased segregation is the idea of "white flight" to private schools. Some literature presents evidence that white flight is a contributing factor in districts, while others reject these claims. Conlon and Kimenyi (1991) suggest that the probability of a white student attending a private school is dependent on the share on minorities in the population. Later research by Lankford and Wyckoff (1997) supports this claim. However, others studies argue that the probability of attending private school among all students is insensitive to the minority share of public schools at both the elementary and secondary level (Buddin, Cordes, & Kirby 1998).

Since the waning of court orders, there has been a general national trend towards the increasing isolation of minorities in public schools—specifically in regards to African-American and Hispanic students. A study in 2002 by the Civil Rights Project at Harvard University found there to be decreasing black and Latino exposure to white students in nearly every large school district examined; the pool of school districts in the study spanned across the entirety of the US

(Frankeberg & Lee 2002). In regards to the South, racial imbalances in schools have been increased rapidly since the 1990s (Orfield 2001).

Specifically, however, the question of resegregation in public schools has become a question of great concern to North Carolina. A most recent study by Clotfelter, Vigdor, and Ladd (2013) concluded that school districts in the state "remain 'segregated,' in the sense that schools within counties differ from one another in racial or economic composition" (p. 14). They have shown that while racial segregation levels have leveled off in the most recent years, the level of economic segregation in schools has become a bigger question than segregation by race for the state. The analysis set forth in their paper is very comprehensive, but for rural counties in eastern North Carolina, the level of discussion is mostly generalized in the region as a whole. Based off their analysis, eastern North Carolina schools appear to not have displayed much of significant trend in the past 15 years, although the level of racial imbalance appears slightly larger than the high school level. Additionally, they do not separate primary and secondary schools apart for the economic segregation analysis of the region.

Although I will not be examining the reasons for segregation trends in rural North Carolina, there may be more nuance in the actual unit of analysis. Most studies do not differentiate between primary and secondary education in more rural districts. Therefore, the question I will ask in this paper is as such: How do primary and secondary schools in eastern North Carolina differ in economic and racial composition, if at all, and how much do they reflect generalized trends of the region?

Methodology

The analysis employed in this paper examines racial and economic segregation in eight counties in North Carolina with "neighborhood school" systems. As mentioned earlier, this means that students are assigned to a school based off where their place of residence is located. In this paper, "county" and "school district" will be used interchangeable since the counties in question each have a single district.

To measure the level of racial segregation between schools in a given school district, researchers utilize various techniques. In this paper, the *index of dissimilarity* is used as the metric for analysis. The index calls for a two-way categorization of data, which for the purposes of this study will be "white" and "nonwhite." These designations will be discussed in further detail later. The following formula is used to calculate the dissimilarity index:

$$D = \frac{\sum_i T_i |p_i - p|}{2Tp(1-p)},$$

in which , T_i and p_i indicate total population of students and proportion of nonwhite students in school i respectively. T and p indicate the total student population and proportion of nonwhite students for the district as a whole.

The dissimilarity index is a value indicating what percentage of students in the district would have to migrate in order for each school to perfectly reflect the proportion of white and nonwhite students in the district as a whole. A value of 0.25, for example, signifies that 25 percent of students in the district would have to switch schools in order for each school to perfect represent the proportion of white and nonwhite students in the district as a whole. Due to the nature of the formula, the dissimilarity index will always be a value with a range from 0

(indicating the school all have identical racial demographics and no migration is necessary) to 1 (indicating the max dissimilarity possible). Given this property of normalization and that it takes into account the specific proportions of each district, the dissimilarity index can be compared between districts to show if one is "more segregated" than another. It can also be measured within a district over time, to show if segregation has increased or decreased over a period.

The annual dissimilarity index for each county was calculated from the 1998/99 to the 2010/11 school year for both high schools and elementary schools. In order to avoid confounding variables due to high school dropouts, ethnic data for 9th grade students was used as the measurement for the racial index. For primary schools, ethnic data for 3rd grade students was used as the measurement. Taking a specific grade level for elementary schools is equally as important since each school varies in the grade ranges. For example, some primary schools only have students between 1st through 3rd grade whereas others encompass Kindergarten through the 4th grade.

The dissimilarity index can be adapted to convey economic dissimilarity as well. Instead of using the proportion of two ethnic groups, these proportions are replaced by the proportion of students eligible for free or reduced lunch versus students who are ineligible. These values were calculated for the eight chosen districts over the same time period at the primary and secondary school level.

Once the racial and economic dissimilarity indices were calculated for the eight counties, they were analyzed by change over time regression over two different levels. First, at the district level as whole, in which the dissimilarity index for primary and secondary schools was average together to see if a general trend could be seen for the eight counties. Next, they were analyzed

separately. The calculated regression statistics and indices were examined side-by-side to observe if any meaningful relationships or differences could be seen.

For the change over time analysis, a one-tailed test of the correlation coefficient *R* was used with a confidence interval of *p=0.01* and a null hypothesis that *R = 0.* If the correlation was found strong enough to reject the null, it can be said is that the increase or decrease in dissimilarity index across the time period has move in the given direction with 99 percent confidence as time has passed. It does not tell us anything about how much a district has increased or decreased in segregation, but whether the direction of the trajectory is significant. It provides a way to compare trends between primary and secondary schools of a district, or between two different districts with a fair and consistent lens.

Results

Racial Dissimilarity Analysis:

Observed from a macro-lens, the eight county sample shows little change from the 1998/99 to 2010/11 period. Table 1 displays the white/nonwhite dissimilarity indices of the eight county sample across primary, intermediate, and secondary public schools. The R-Value of the district as a whole over time, 0.47, failed to reject the null hypothesis that there is any significant change in the racial dissimilarity index over the time period.

Table 1: White/Nonwhite Dissimilarity for the Eight County Sample

1998/99	2001/02	2004/05	2007/8	2010/11	R-Value	*df*	Critical R Value (*p=0.01*)	Null Hypothesis (*r=0*)
0.30	0.29	0.30	0.31	0.31	0.486	11	0.634	True

Source: National Center for Education Statistics, Common Core of Data, 1998/99 through 2010/2011, Authors Calculation

Table 2: 9th Grade White/Nonwhite Dissimilarity Indices and Regression Statistics for Sample Counties, 1998/99-2010/11									
County	**1998/99**	**2001/02**	**2004/05**	**2007/08**	**2010/11**	**R-Value**	***df***	**Critical Value (p = *0.01*)**	**Null Hypothesis (*r = 0*)**
Craven	0.04	0.01	0.01	0.04	0.06	0.008	11	0.634	True
Edgecombe	0.23	0.19	0.22	0.29	0.31	0.733	11	0.634	Rejected
Lenoir	0.36	0.41	0.44	0.47	0.46	0.771	11	0.634	Rejected
Nash	0.22	0.21	0.19	0.16	0.18	-0.635	11	0.634	Rejected
Pender	0.31	0.35	0.32	0.36	0.39	0.837	11	0.634	Rejected
Pitt	0.14	0.15	0.18	0.21	0.22	0.803	11	0.634	Rejected
Wayne	0.37	0.34	0.31	0.32	0.31	-0.669	11	0.634	Rejected
Wilson	0.14	0.17	0.19	0.15	0.14	-0.085	11	0.634	True
Average	0.23	0.24	0.23	0.25	0.26	0.726	11	0.634	True
Source: National Center for Education Statistics, Common Core of Data, 1998/99 through 2010/2011, Authors Calculations									

Once examined at the high school level, a trend towards dissimilarity emerges. Table 2 displays the calculated racial dissimilarity indices for the eight counties from five different school years as well as the results of the regression analysis. The averaged dissimilarity of theeight counties over the 13 year period displays a trend of increasing dissimilarity, suggesting that the individual counties also show this trajectory. The R- value, 0.726, was greater than the critical value, allowing us to say with 99 percent confidence that as time has passed in the 13 year period, the average dissimilarity has increased. For clarification, it is important to reiterate that the change cannot be extrapolated beyond the observed period. We cannot say based off these calculated values that the dissimilarity has grown in the 2011/2012 and 2012/2013 school years. This could only be said if we had access to the data to calculate the subsequent indices.

However, looking at the high school districts individual counties shows that there is more variation than the aggregate. Four of the counties, Edgecombe, Lenoir, Pender, and Pitt, displayed trends of increasing dissimilarity across the time period. All four of their calculated R-values over the period were greater than critical R-values. By contrast, Nash and Wayne counties displayed trends of decreasing racial dissimilarity over the time period, with negative correlation coefficients rejecting the null hypothesis as well. Craven County and Wilson County did not

Table 3: 3rd Grade and 9th Grade White/Nonwhite Dissimilarity Indices and Regression Statistics

County	Grade Level	1998/99	2001/02	2004/05	2007/08	2010/11	R-Value	*df*	Critical R-Value (*p=.01*)	Null Hypothesis (*r=0*)
Craven	**9th Grade**	0.04	0.01	0.01	0.04	0.06	0.008	11	0.634	True
	3rd Grade	0.26	0.23	0.30	0.31	0.32	0.457	11	0.634	True
Edgecombe	**9th Grade**	0.23	0.19	0.22	0.29	0.31	0.733	11	0.634	Rejected
	3rd Grade	0.28	0.30	0.31	0.32	0.32	0.334	11	0.634	True
Lenoir	**9th Grade**	0.36	0.41	0.44	0.47	0.46	0.771	11	0.634	Rejected
	3rd Grade	0.44	0.39	0.44	0.38	0.43	0.306	11	0.634	True
Nash	**9th Grade**	0.22	0.21	0.19	0.16	0.18	-0.635	11	0.634	Rejected
	3rd Grade	0.35	0.35	0.36	0.37	0.34	0.157	11	0.634	True
Pender	**9th Grade**	0.31	0.46	0.32	0.36	0.39	0.837	11	0.634	Rejected
	3rd Grade	0.28	0.33	0.27	0.43	0.36	0.514	11	0.634	True
Pitt	**9th Grade**	0.14	0.15	0.18	0.21	0.22	0.803	11	0.634	Rejected
	3rd Grade	0.24	0.23	0.26	0.28	0.30	0.531	11	0.634	True
Wayne	**9th Grade**	0.37	0.34	0.31	0.32	0.31	-0.669	11	0.634	Rejected
	3rd Grade	0.47	0.44	0.44	0.46	0.47	0.250	11	0.634	True
Wilson	**9th Grade**	0.14	0.17	0.19	0.15	0.14	0.085	11	0.634	True
	3rd Grade	0.59	0.49	0.52	0.47	0.43	0.391	11	0.634	True
Average	**9th Grade**	0.23	0.24	0.23	0.25	0.26	0.726	11	0.634	Rejected
	3rd Grade	0.37	0.35	0.36	0.38	0.37	0.300	11	0.634	True

Source: National Center for Education Statistics, Common Core of Data, 1998/99-2010/2011, Authors Calculations

display any trend, with extremely small correlation coefficients. Although the average racial dissimilarity of the eight counties increased 1998/1999 to 2010/2011, its associated R-value of 0.726 failed to reject the null hypothesis.

The trend of dissimilarity does not necessarily indicate the degree of dissimilarity however. Wayne County, although it is desegregating, still has one of the highest levels of 9th grade racial dissimilarity among the eight counties. Pitt County by contrast, which has become more dissimilar over the period, maintain a lower index by 0.09. Additionally, the degree of dissimilarity at the beginning of the observed time period does not predict the trend. Pitt County, which had one of the three lowest dissimilarity indices in the first observed year, increased from 0.14 to 0.22 over the entire period whereas Nash County did the revers, from 0.22 to 0.14.

The racial dissimilarity indices for the elementary schools display remarkably different trends and degrees of dissimilarity at the 3rd grade level. Table 3 presents the racial dissimilarity

Table 4: Average Difference Between 3rd and 9th Grade Racial Dissimilarity Indices, 1998/99 – 2010/11

1998/99	2001/02	2004/5	2007/08	2010/11	Average Difference Over Period
0.14	0.12	0.13	0.13	0.11	0.12

Source: National Center for Education Statistics, Common Core of Data, 1998/99 through 2010/2011, Authors Calculation

indices and regression statistics of the 3rd grade level alongside the 9th grade values for the eight counties. In every county except Pender and Lenoir, the 3rd grade racial dissimilarity index was greater than the 9th grade index in the 2010/11 school year. Table 4 presents a summary statistics of the average difference between the 3rd grade and 9th grade racial dissimilarity over the period; the average difference has maintained a level of above 0.1 over the period.

However, unlike the 9th grade racial dissimilarity indices, the calculated R values for each of the eight counties at the 3rd grade level do not show any trend based off the regression analysis. Wilson County's index, for example, decreased from 0.59 at the beginning of the time period to 0.43 at the end, but the R-value of 0.391 was unable to reject the null. The average 3rd grade index fails to show any trend as well. Although the elementary schools have consistently maintained a higher level of racial dissimilarity, the level of dissimilarity appears to have maintained a steady level from 1998/99 to 2010/11.

Economic Dissimilarity Analysis:

At the district-level as a whole, the economic dissimilarity of the eight counties shows no meaningful change over the 13 year period much like the case of racial dissimilarity. Table 5 shows the averaged economic dissimilarity for the eight counties across the 1998/99 to 2010/11 time period, appearing to hold steady at a level around 0.24. The R-value of 0.286 does not provide any meaningful information; there appears to be some slight positive association of

Table 5: Economic Dissimilarity for the Eight County Sample Calculated using Free and Reduce Lunch as Measure of Poverty								
1998/99	2001/02	2004/05	2007/8	2010/11	R- Value	*df*	Critical R Value (*p=0.01*)	Null Hypothesis (*r=0*)
0.23	0.23	0.24	0.23	0.24	0.286	11	0.634	True
Source: National Center for Education Statistics, Common Core of Data, 1998/99 through 2010/2011, Authors Calculation								

economic dissimilarity over the time period, but not nearly a strong enough correlation to reject the null hypothesis.

Separating the primary school and high school data apart from each other fails to provide many significant relationship over time as was the case in the racial dissimilarity analysis. Table 6 summarizes the calculated the economic dissimilarity indices and subsequent regression analysis for the two subgroups. Craven and Wilson County displayed a strong positive correlation over time, with R-Values equal to 0.71 and 0.73 respectively. These counties showed very little economic dissimilarity at the beginning of the time period, and by the end of the period remained under the average for high schools. However, these were the only two cases among both primary secondary schools that held a strong enough to change to reject the null.

A few modest other modest trends occurred over the period, but were not strong enough to pass the confidence interval set forth in the paper. Craven County primary schools, for example, rose from 0.39 in the 1998/99 school year to 0.47 in the 2010/11 school year, but the association R-Value was only 0.47. Edgecombe and Wayne County primary schools were the only two cases to display a negative association of economic dissimilarity over time, with notable R-values of -0.57 and -0.58. Due to consistency in the analysis though, these changes over time could not be regarded with the same level of confidence as the other noted relationships.

Table 6: Free and Reduced Lunch Eligible/Ineligible Dissimilarity Indices and Regression Statistics for Sample Counties, 1998/99-2010/11

County	Grade Level	1998/99	2001/02	2004/05	2007/08	2010/11	R	*df*	Critical R-Value (p=.01)	*Null Hypothesis (r=0)*
Craven	**Secondary**	0.05	0.04	0.10	0.10	0.12	0.71	11	0.634	Rejected
	Primary	0.39	0.44	0.46	0.45	0.46	0.47	11	0.634	True
Edgecombe	**Secondary**	0.15	0.16	0.08	0.12	0.13	0.31	11	0.634	True
	3rd Grade	0.34	0.22	0.17	0.15	0.16	-0.57	11	0.634	True
Lenoir	**Secondary**	0.33	0.09	0.21	0.23	0.23	0.04	11	0.634	True
	Primary	0.28	0.22	0.37	0.26	0.30	0.01	11	0.634	True
Nash	**Secondary**	0.03	0.04	0.03	0.05	0.11	0.01	9	0.735	True
	Primary	0.21	0.38	0.31	0.28	0.26	0.03	9	0.735	True
Pender	**Secondary**	0.23	0.20	0.24	0.28	0.28	0.42	11	0.634	True
	Primary	0.25	0.46	0.36	0.35	0.36	0.14	11	0.634	True
Pitt	**Secondary**	0.18	0.13	0.15	0.13	0.15	0.09	9	0.735	True
	Primary	0.26	0.33	0.30	0.28	0.30	0.11	9	0.735	True
Wayne	**Secondary**	0.32	0.31	0.23	0.27	0.27	0.11	10	0.708	True
	Primary	0.44	0.35	0.34	0.24	0.24	-0.58	11	0.634	True
Wilson	**Secondary**	0.06	0.11	0.11	0.12	0.15	0.73	11	0.634	Rejected
	Primary	0.22	0.39	0.44	0.38	0.40	0.24	11	0.634	True
Average	**Secondary**	0.17	0.11	0.14	0.16	0.18	0.30	9	0.634	True
	Primary	0.30	0.35	0.34	0.30	0.31	0.08	11	0.634	True

Source: National Center for Education Statistics, Common Core of Data, 1998/99-2010/2011, Authors Calculations

Though primary and secondary schools in the region failed to show much notable change in dissimilarity indices over time, the difference between the degrees of dissimilarity provided interesting findings. Much like the earlier racial dissimilarity analysis, the primary schools displayed a much higher level of economic dissimilarity compared to the secondary schools of their respective districts. In every sample time period provided in Table 6, the economic dissimilarity of primary schools is always more substantial than the secondary schools of the district. The differences between the two were averaged over the period as a whole, and the results can be seen in Table X. Over the 13 year period, primary schools were on average more dissimilar than secondary schools by 0.17 points.

Table 7: Average Difference Between 3rd and 9th Grade Racial Dissimilarity Indices, 1998/99					
1998/99	2001/02	2004/5	2007/08	2010/11	Average Difference Over Period
0.13	0.24	0.20	0.14	0.13	0.17
Source: National Center for Education Statistics, Common Core of Data, 1998/99 through 2010/2011, Authors Calculation					

Conclusions

The analysis suggests racial and economic segregation in rural counties is greatly nuanced once disaggregated between primary and secondary schools. Generalities of change over time patterns in rural districts do not capture the full story. The farther that the analysis zoomed in, the more variation that was found between school districts and within school districts. The question of rural segregation may be more complicated to address than expected.

Although high schools as a group displayed a trend of increased racial dissimilarity over the past decade, a closer look shows that some districts have displayed an opposite trend of desegregation over the same period. The average racial dissimilarity of the region had a fairly large positive R-value of 0.726, suggesting that the eight counties would share similar values. In actuality, only five of the observed counties displayed a positive correlation over the period. Wayne County and Nash County's negative association over time was masked by the much stronger positive correlations of counties such as Pitt and Pender.

Additionally, the average economic and racial dissimilarity indices of the school districts on the macro level fail to capture the large difference between primary and secondary schools in each district. In the analysis, it was shown that the average racial and economic dissimilarities by district were much higher in elementary schools than in high schools. This is because at the individual school level, elementary schools show much more extreme variation than high schools

Table 8: Craven County Racial Dissimilarity Breakdown and Proportion Nonwhite by School, 2010.11			
Craven County Racial Dissimilarity: 0.22			
Primary School Dissimilarity	0.32	**High School Dissimilarity**	0.06
Proportion Non-White by High School		**Proportion Non-White by High School**	
CREEKSIDE ELEM	0.10	WEST CRAVEN HIGH	0.41
BRINSON MEMORIAL ELEMENTARY	0.22	HAVELOCK HIGH	0.37
BRIDGETON ELEMENTARY	0.22	NEW BERN HIGH	0.43
ALBERT H BANGERT ELEMENTARY	0.26	CRAVEN EARLY COLLEGE	0.34
W JESSE GURGANUS ELEMENTARY	0.26		
ARTHUR W EDWARDS ELEMENTARY	0.32		
VANCEBORO-FARM LIFE ELEM	0.36		
BEN D QUINN ELEMENTARY	0.38		
GRAHAM A BARDEN ELEMENTARY	0.38		
JAMES W SMITH ELEMENTARY	0.48		
HAVELOCK ELEMENTARY	0.57		
ROGER R BELL ELEMENTARY	0.59		
TRENT PARK ELEMENTARY	0.61		
OAKS ROAD ELEMENTARY	0.81		
J T BARBER ELEMENTARY	0.87		
Source: National Center for Education Statistics, Common Core of Data, 1998/99 through 2010/2011, Authors Calculation			

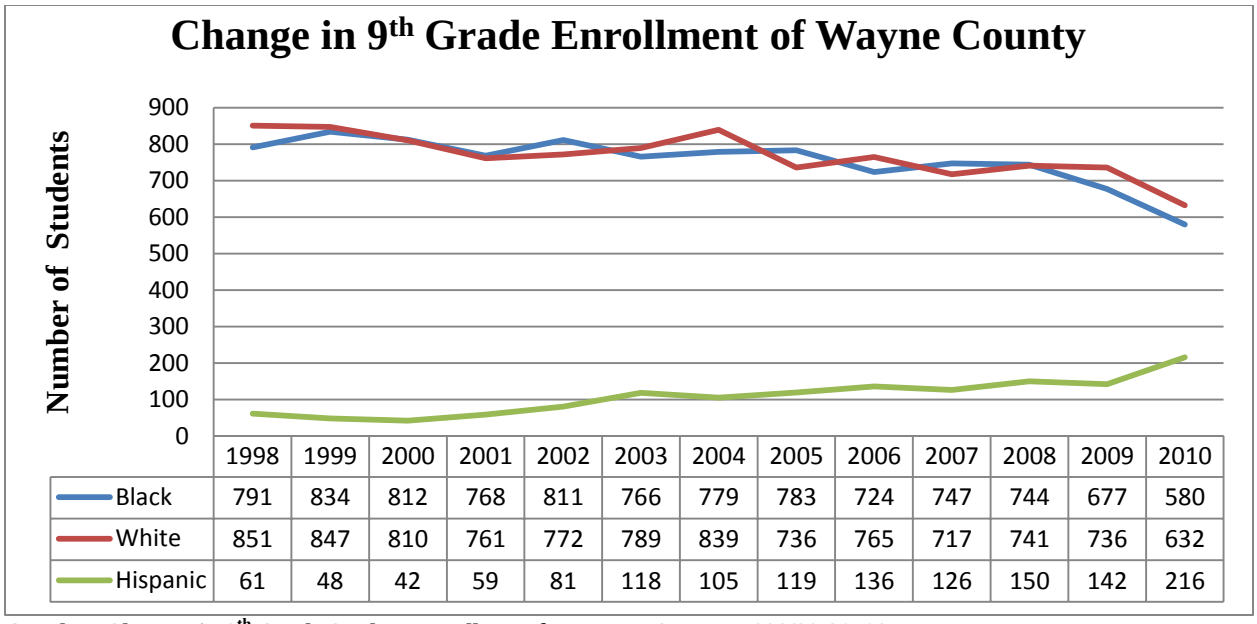
To better illustrate this, Table 8 depicts the proportion of nonwhite students in each public elementary and high school in Lenoir County alongside their respective dissimilarity index. At the elementary school level, there are schools with over 80 percent nonwhite students such as J T Barber Elementary sharing the same district as schools with only 10 percent nonwhite students. The tendency for over-majority nonwhite and low-income students in certain primary schools is a common pattern in all eight of the districts.

Very few cases of strong correlation between both dissimilarity indices and time were found in the study, but this lack of change over the 13 year period is just as significant of an observation. It means that the issue of racial and economic disparities in most rural districts is

not correcting itself. Although a level of significant dissimilarity cannot be determined, what can be said is that the observed school districts did not reflect their district demographics in the 1998/99 school year, nor have they changed to reflect them in the most recent observation.

There are a number of possible reasons for my findings. One reason for the tendency of rural districts to either reflect negligible change in dissimilarity over time or increased dissimilarity is of unchanged attendance zones. This applies to both racial and economic dissimilarity. In rural counties, students are assigned to schools based off what geographical attendance zone they live in. Local school boards have the ability to adapt attendance zones to reassign students, but this policy is generally neglected. As a result, individual schools' demographics are highly contingent upon the community level demographics of its "neighborhood." In a case study by Joyner and Marsh, they concluded that Goldsboro High School—the case presented in the introduction of this paper—is "hyper-segregated because of residential segregation patterns and the School Board's desire to maintain 'neighborhood schools'" (2007).

Additionally, another possible reason explaining the variable index measures could be that the relative changes between white and nonwhite ethnic groups, namely Hispanics. Graph 1 shows the changes in 9th grade enrollment for Wayne County over the observed time period. As seen in the graph, the enrollment of black and white students has been decreasing in Wayne County over the observed time period. The literature suggests that Hispanic immigrants are more likely to be residentially segregated, and therefore they would be more likely to attend the same public school based of neighborhood attendance zones. Perhaps the reason why Wayne County displayed decreasing racial dissimilarity over the 1998/99-2010/11 time period is due to the balancing out of predominantly white schools with the immigrant population.



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Black	791	834	812	768	811	766	779	783	724	747	744	677	580
White	851	847	810	761	772	789	839	736	765	717	741	736	632
Hispanic	61	48	42	59	81	118	105	119	136	126	150	142	216

Graph 1: Changes in 9th Grade Student Enrollment for Wayne County, 1998/99-2010/11
Source: National Center for Education Statistics, Common Core of Data, 1998/99-2010/11

A statistical limitation of this paper is the non-inclusion of intermediate schools in the analysis. Although meaningful trends about the eastern North Carolina region were explored in this paper, analyzing middle schools alongside the elementary and high schools would add an extra level of depth to discussing nuances.

Although this paper was concerned with examining trends in public schools, analyzing private schools in the county districts alongside the public schools would have similarly provided an extra lens to examine segregation in rural North Carolina as a possible causal mechanism for the different trends observed. However, the inclusion of private schools would have been difficult do to the lack of good recordkeeping on the demographic and economic statistics necessary for this analysis.

Given that rural counties have neighborhood systems of schools based of community level demographic data, it would be interesting to measure economic and racial dissimilarity changes in the district alongside housing patterns and changes in residential segregation. For

example, perhaps the reason elementary schools are more likely to be racially or economically segregated is due to the housing prices of its attendance zone.

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